

Silicon Diffused Power Transistor

BUW14

GENERAL DESCRIPTION

High-voltage, high-speed, glass passivated npn power transistor in a SOT82 envelope intended for use in converters, inverters, switching regulators, motor control systems and switching applications.

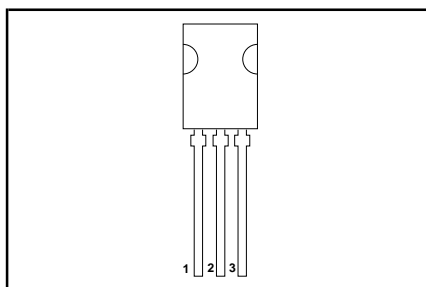
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0\text{ V}$	-	1000	V
V_{CEO}	Collector-emitter voltage (open base)		-	450	V
I_C	Collector current (DC)	$T_{mb} \leq 60\text{ }^\circ\text{C}$	-	0.5	A
I_{CM}	Collector current peak value		-	1	A
P_{tot}	Total power dissipation		-	20	W
t_f	Fall time		0.4	-	μs

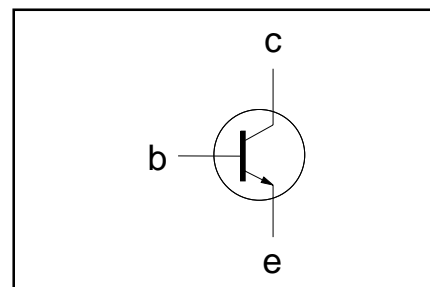
PINNING - SOT82

PIN	DESCRIPTION
1	emitter
2	collector
3	base

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum Rating System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0\text{ V}$	-	1000	V
V_{CEO}	Collector-emitter voltage (open base)		-	450	V
I_C	Collector current (DC)	$T_{mb} \leq 60\text{ }^\circ\text{C}$	-	0.5	A
I_{CM}	Collector current peak value		-	1	A
I_B	Base current (DC)		-	0.2	A
I_{BM}	Base current peak value		-	0.3	A
$-I_{BM}$	Reverse base current peak value ¹		-	0.3	A
P_{tot}	Total power dissipation	-	-	20	W
T_{stg}	Storage temperature	-	-65	150	$^\circ\text{C}$
T_j	Junction temperature	-	-	150	$^\circ\text{C}$

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Junction to mounting base	-	-	4.5	K/W
$R_{th\ j-a}$	Junction to ambient	in free air	100	-	K/W

¹ Turn-off current.

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STATIC CHARACTERISTICS

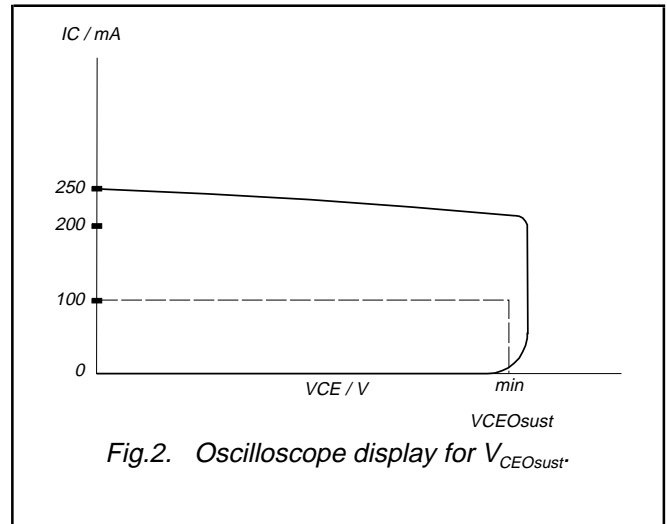
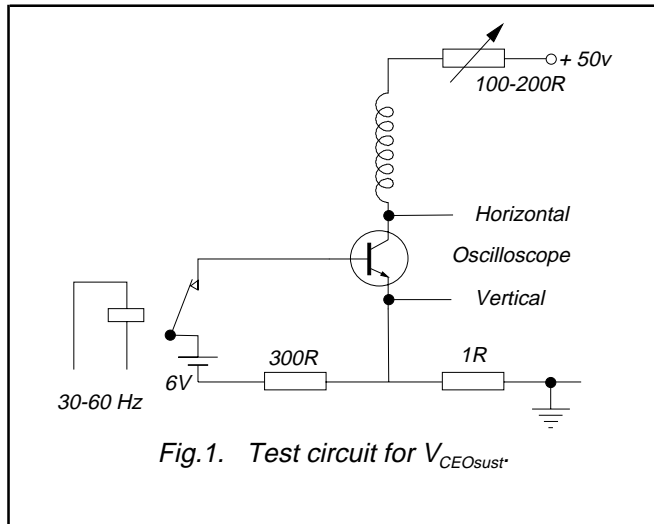
$T_{mb} = 25\text{ }^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CES}	Collector cut-off current ²	$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$	-	-	100	μA
I_{CES}		$V_{BE} = 0\text{ V}; V_{CE} = V_{CESMmax}$ $T_j = 125\text{ }^\circ\text{C}$	-	-	1.0	mA
I_{EBO}	Emitter cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	1.0	mA
$V_{CEO\text{sust}}$	Collector-emitter sustaining voltage	$I_B = 0\text{ A}; I_C = 100\text{ mA};$ $L = 25\text{ mH}$	450	-	-	V
$V_{CE\text{sat}}$	Collector-emitter saturation voltages	$I_C = 0.1\text{ A}; I_B = 10\text{ mA}$	-	-	0.8	V
$V_{CE\text{sat}}$		$I_C = 0.2\text{ A}; I_B = 20\text{ mA}$	-	-	1.0	V
$V_{BE\text{sat}}$	Base-emitter saturation voltage	$I_C = 0.2\text{ A}; I_B = 20\text{ mA}$	-	-	1.0	V
h_{FE}	DC current gain	$I_C = 50\text{ mA}; V_{CE} = 5\text{ V}$	-	50	-	
h_{FE}		$I_C = 300\text{ mA}; V_{CE} = 5\text{ V}$	25	50	100	

DYNAMIC CHARACTERISTICS

$T_{mb} = 25\text{ }^\circ\text{C}$ unless otherwise specified

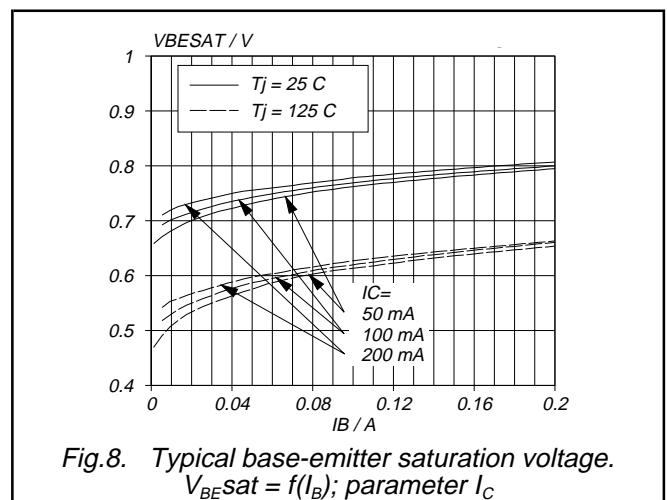
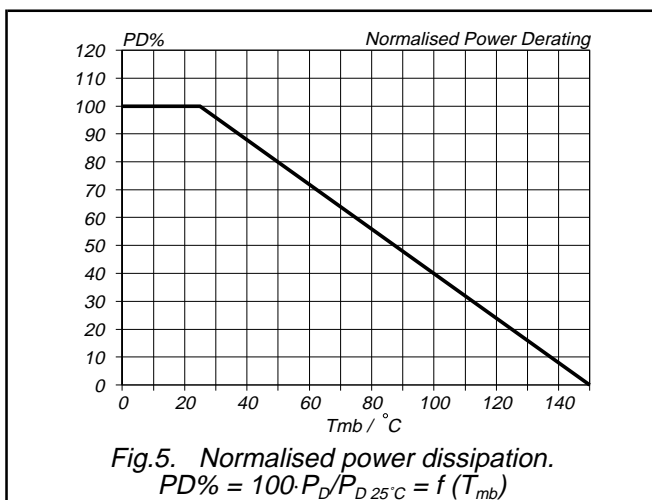
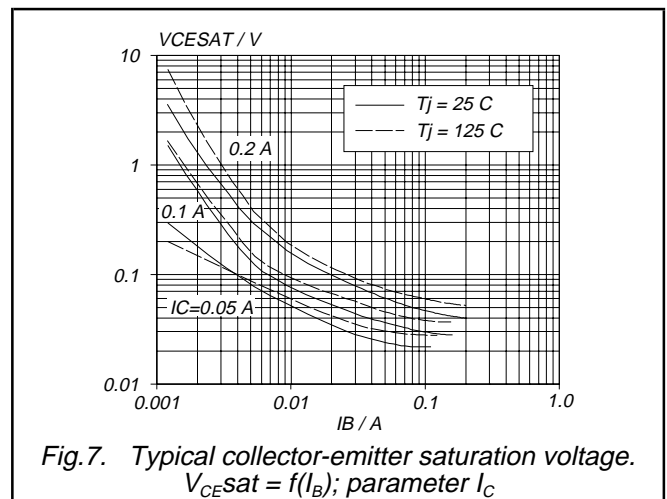
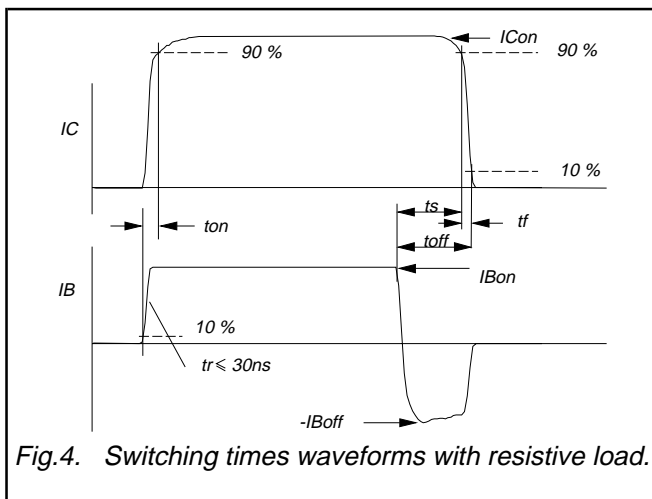
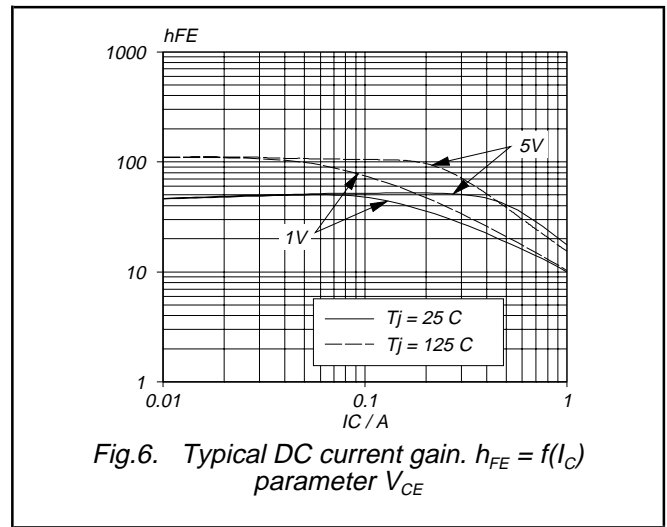
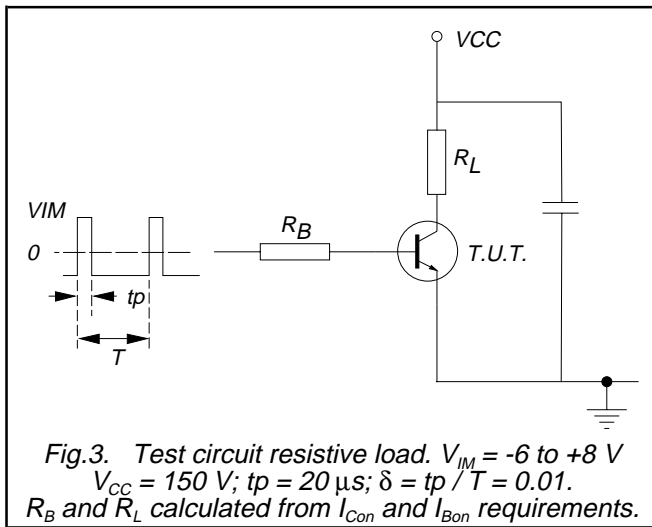
SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
f_T	Transition frequency	$I_C = 0.2\text{ A}; V_{CE} = 10\text{ V}; f = 1\text{ MHz}$	20	-	MHz
t_{on}	Turn-on time	$I_{Con} = 0.2\text{ A}; I_{Bon} = 20\text{ mA};$ $-I_{Boff} = 40\text{ mA}; V_{CC} = 250\text{ V}$ $T_{mb} = 95\text{ }^\circ\text{C}$	0.4	0.7	μs
t_s	Turn-off storage time		3.5	5.0	μs
t_f	Turn-off fall time		0.4	-	μs
t_f	Turn-off fall time		-	1.3	μs



2 Measured with half sine-wave voltage (curve tracer).

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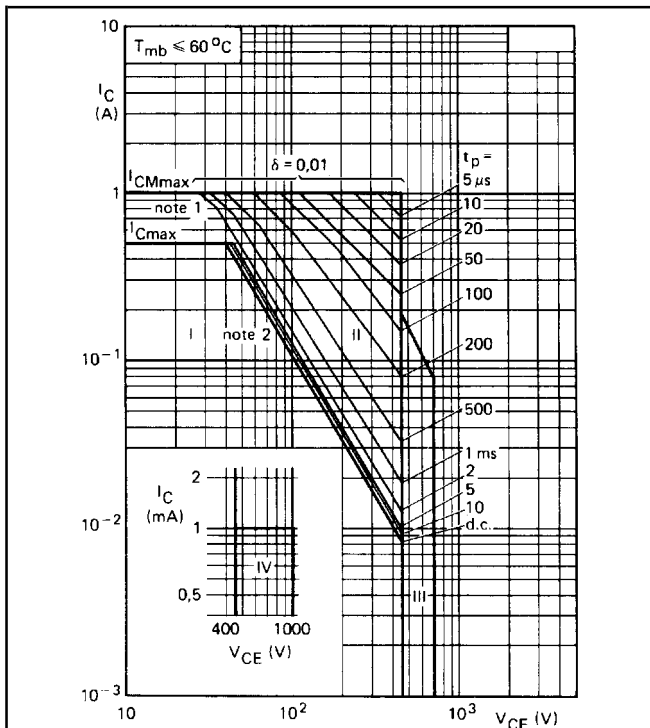


Fig. 9. Forward bias safe operating area.

- (1) P_{tot} max line.
- (2) Second-breakdown limits.
- I Region of permissible DC operation.
- II Permissible extension for repetitive pulse operation.
- III Area of permissible operation during turn-on in single transistor converters, provided $R_{BE} \leq 100 \Omega$ and $t_p \leq 0.6 \mu s$.
- IV Repetitive pulse operation in this region is permissible provided $V_{BE} \leq 0$ and $t_p \leq 2 ms$.

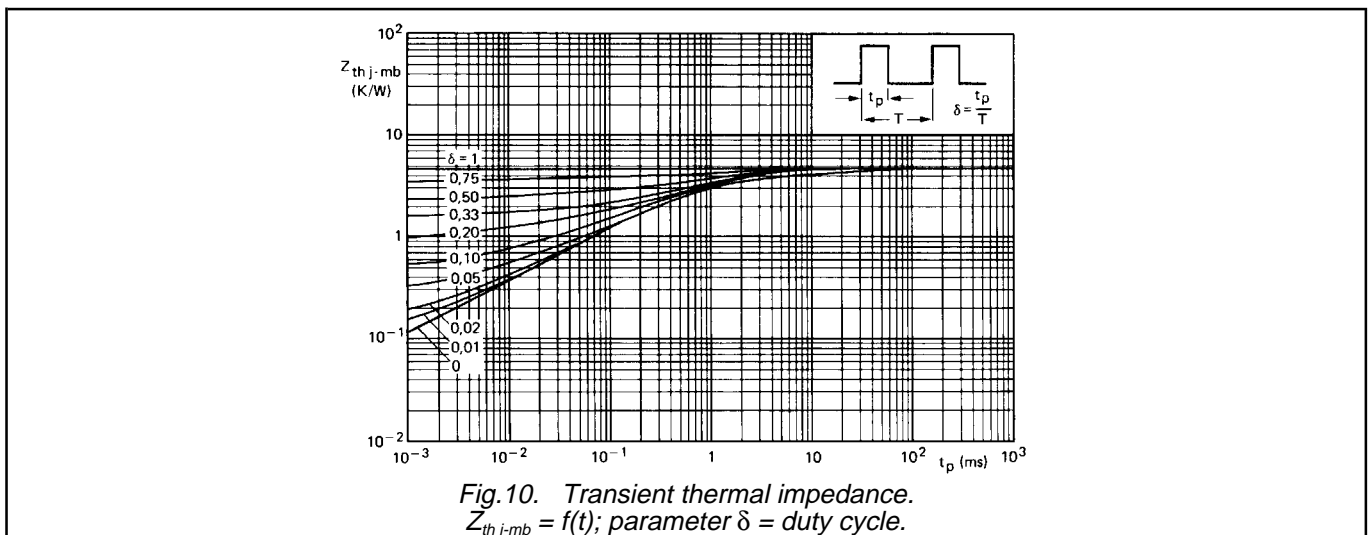
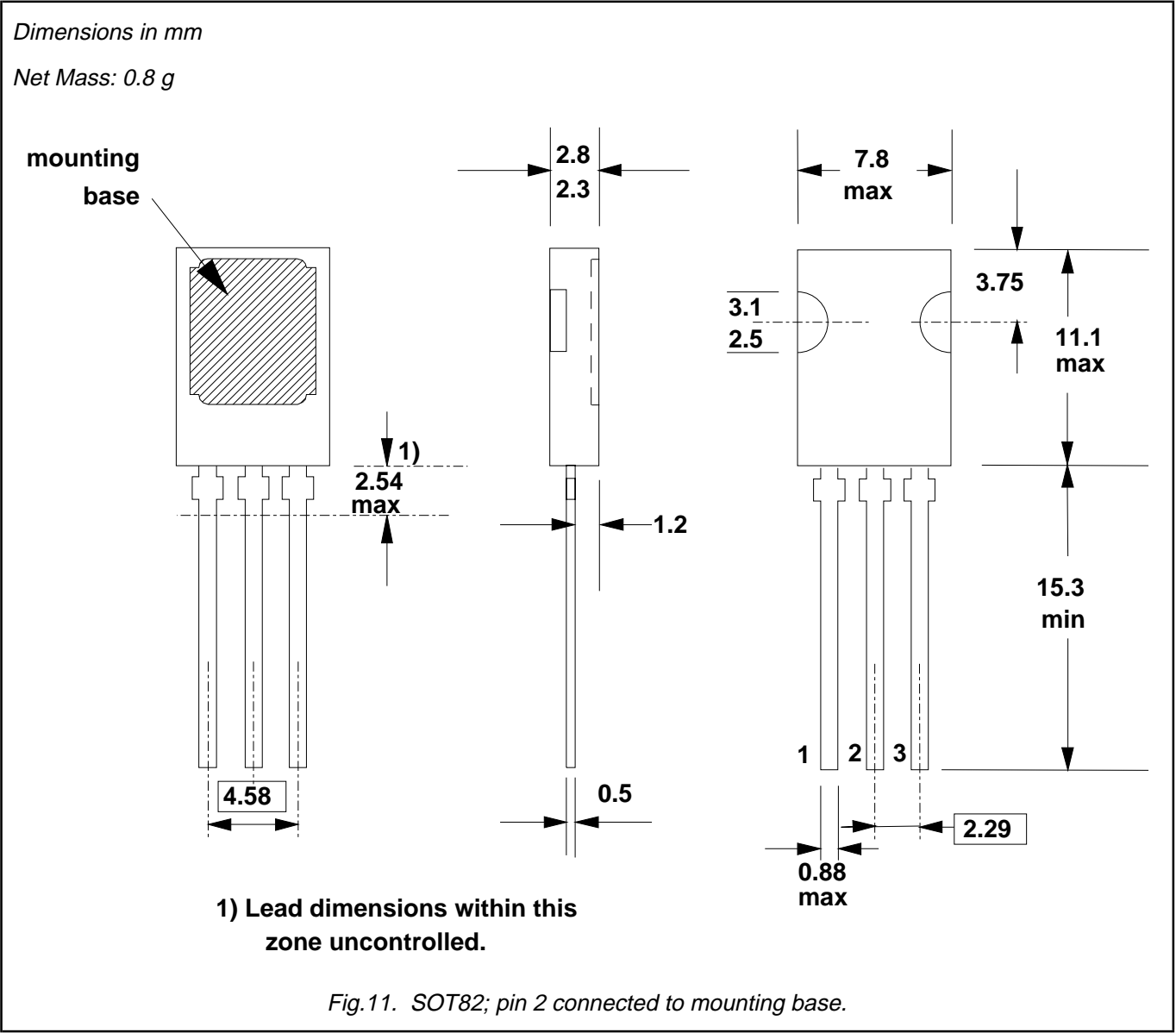


Fig. 10. Transient thermal impedance.
 $Z_{th j-mb} = f(t)$; parameter $\delta =$ duty cycle.

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MECHANICAL DATA



Notes

- 1. Refer to mounting instructions for SOT82 envelopes.
- 2. Epoxy meets UL94 V0 at 1/8".

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DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	
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